

TELECOMMUNICATIONS PANEL FLAME SHIELD AND WIRE TROUGH

BACKGROUND OF THE INVENTION

1. Field of the Invention

[001] The present invention relates to flame and heat shields. More particularly, the present invention relates to a flame and heat shield, which protects a housing and/or equipment employed on a rack-mounted electronics assembly.

2. Description of the Background Art

[002] A rack-mounted electronics assembly is often employed in a central office equipment room or wiring closet. In the wiring closet, interconnections for telephone and network services are established. In other words, perhaps hundreds or thousands of twisted pairs, coaxial cables, fiber optic lines, etc. are selectively interconnected via various equipment.

[003] Figure 1 illustrates a front view of a rack system 10 in a typical wiring closet and Figure 2 illustrates a rear view the rack system 10 in the wiring closet. As illustrated in Figures 1 and 2, a plurality of digital cross connect (DSX) panels 5 are attached to a first rail 7 and a second rail 8 constituting the rails of the rack system 10. Further, a power supply 4 is attached to the first and second rails 7, 8, below a lowermost DSX panel 5'. Building wiring 12, which is connected to various equipment throughout the building, e.g. jacks, computers, printers, facsimile machines, telephones, etc., enters and exits the rack system 10 from overhead. The building wiring 12 enters and exits the backs of respective DSX

panels 5 and is connected therein to terminals, e.g. wire wrap terminals, insulation displacement connectors (IDC's). The fronts of the DSX panels 5 include a plurality of jacks and/or jumpers, so that a technician can make organized interconnections between the building wiring 12.

[004] Figure 3 is a close-up view illustrating a rear perspective of the lowermost DSX panel 5' attached to the first and second rails 7, 8. The building wiring 12 has been removed to simplify the illustration. However, it should be noted that the building wiring 12 would enter and exit the lowermost DSX panel 5' via portals 13. The lowermost DSX panel 5' includes a first side wall 14, an opposite second side wall 15, a bottom surface 16 and a rear surface 17. The rear surface 17 includes the portals 13. Further, the DSX panel 5' is attached to the rack system 10 by bolts or nuts 2 or similar fasteners, which pass through placement holes 3 formed in the first and second rails 7, 8 and through mounting holes 18 formed in side tabs 19 of the DSX panel 5' (See Figure 5).

[005] Occasionally, a fire will occur in one of the components mounted on the rack system 10. Fires are usually not started by a component part of the DSX panel 5, since the wiring and interconnections therein are mostly passive. Most often, the fire is associated with a defective or failed component of the power supply 4, such as a transistor, capacitor, or transformer. In accordance with the background art, a fire in the power supply 4 has occasion to destroy not only the component parts of the power supply, but also to destroy or damage one or more DSX panels 5. The lowermost DSX panel 5' is most susceptible due to its immediate proximity to the power supply 4 and the fact that heat and flame will rise, and the fact that the DSX panels are typically manufactured of plastic.

SUMMARY OF THE PRESENT INVENTION

[006] It is an object of the present invention to address one or more of the drawbacks associated with the background art.

[007] It is an object of the present invention to provide a structure to limit the damage to the components mounted on a rack system.

[008] It is an object of the present invention to provide a structure to shield one or more of the components of the rack system from heat and/or fire.

[009] It is object of the present invention to provide a structure to guide wires and cables and hence simply the layout of wires and cabling, to improve the appearance of the wires and cables entering and exiting the components of the rack system, and to protect the wires and cables from heat and/or fire.

[010] These and other objects are accomplished by a flame shield which redirects heat and flame away from an undersurface of a housing of electrical equipment, such as a DSX panel installed in a rack system in a wiring closet. The flame shield has a conforming shape to a lower surface of the DSX panel. The flame shield includes tabs with mounting holes, which permit the same fasteners used to initially attach the DSX panel to the rails of the rail system to be reused in attaching the flame shield and DSX panel combination to the rails of the rack system. Also, the flame shield includes an extended portion having a v-shaped cross section, which serves to shield wiring entering the DSX panel from heat and flame and also acts as a wiring guide..

[011] Other objects and further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific

examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[012] The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus, are not limitative of the present invention, and wherein:

[013] Figure 1 is a front perspective view of a rack system in a wiring closet, in accordance with the background art;

[014] Figure 2 is a rear perspective view of the rack system in the wiring closet, in accordance with the background art;

[015] Figure 3 is a rear close-up perspective view of a DSX panel mounted to the rack system, in accordance with the background art;

[016] Figure 4 is a rear perspective view of a flame shield, in accordance with the present invention;

[017] Figure 5 is an exploded view of the flame shield of Figure 4 and the DSX panel of Figure 3;

[018] Figure 6 is an assembled view of the flame shield of Figure 4 and the DSX panel of Figure 3; and

[019] Figure 7 is a rear perspective view of a rack system supporting several DSX panels, each with a flame shield.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[020] Figure 4 is a rear perspective view of a flame shield 20 in accordance with the present invention. The flame shield 20 includes a substantially planar portion 22 having a size approximating the bottom surface 16 of the lowermost DSX panel 5'. A first tab 24 is attached to a first side edge 26. A second tab 28 is attached to a second side edge 30, opposite the first side edge 26. The first and second tabs 24, 28 are substantially perpendicular to the planar portion 22. The first and second tabs 24, 28 include first, second, third, and fourth mounting holes 32, 34, 36, 38 extending therethrough.

[021] A third tab 40 and a fourth tab 42 are attached to the first side edge 26 and the second side edge 30, respectively. The third and fourth tabs 40, 42 are perpendicular to the planar portion 22 and also perpendicular to the first and second tabs 24, 28. The third tab 40 includes first and second screw holes 44, 46. The fourth tab 42 includes third and fourth screw holes 48, 50.

[022] An extended portion 52 extends outwardly away from a rear edge 54 of the planar portion 22. The extended portion 52 forms an acute angle α relative to a plane 56 including the planar portion 22, such that the extended portion 52 initially slants below the planar portion 22. The extended portion 52 includes a bend 58 such that said extended portion 52 slants back toward the plane 56 including the planar portion 22 and presents a substantially v-shape in cross section. A down turned lip 60 may also be included on the rearmost edge of the

extended portion 52. The flame shield 20 may be constructed of known materials, which can function as a flame and heat shield, such as metal or ceramic.

[023] Figure 5 is an exploded rear perspective view illustrating the attachment of the flame shield 20 of Figure 4 to the DSX panel 5' of Figure 3. Figure 6 is a rear perspective view of the flame shield 20 attached to the DSX panel 5'. With reference to Figures 5 and 6, the planar surface 22 of the flame shield 20 is brought to bear, or more preferably brought immediate adjacent to but not touching, the bottom surface 16 of the DSX panel 5'.

[024] In this configuration, the first, second, third and fourth mounting holes 32, 34, 36, 38 of the flame shield 20 are aligned with the mounting holes 18 in the side tabs 19 of the DSX panel 5'. As a result, the same bolts or fasteners used to secure the DSX panel to the first and second rails 7, 8 can be removed and reused to secure the flame shield 20 / DSX panel 5' combination to the first and second rails 7, 8. By the above arrangement, it is possible to secure the flame shield 20 to the lower surface of the DSX panel 5' without using additional fasteners.

[025] If a more secure connection between the flame shield 20 and the DSX panel 5' is desired. It is possible to insert one or more screws or rivets through the screw holes 44, 46, 48, 50 and to engage the screws or rivets into the side walls 14, 15 of the DSX panel 5'.

[026] In operation, the metal or ceramic fabrication of the flame shield 20 protects the plastic DSX panel 5' from damage due to heat and/or flames coming from below the DSX panel 5'. Moreover, the extended portion 52 presents a V-shaped groove which serves to redirect heat and flame away from the building wires 12 entering the portals 13 of the DSX panel 5'. This V-shaped groove also

serves the dual benefit of guiding the building wires 12, such that the building wires 12 may be better organized and have an improved appearance in the rear of the DSX panels 5.

[027] Although the invention has focused on placing the flame shield 20 adjacent to the bottom surface 16 of the lowermost DSX panel 5', it should be apparent that several or all DSX panels 5 on the rack system 10 could also include a flame shield 20. Figure 7 illustrates several DSX panels 5, each of which includes a flame shield 20, in order to organize the associating wiring and to protect the same from flame and heat. Further, although the present invention has discussed DSX panels 5 as being protected by the flame shield 20, it should be apparent that other types of electrical housings could be protected by the flame shield 20.

[028] The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.